

Claims

1. An equipment diagnosis device comprising:

instrument means for measuring a plurality of
instrumentation amounts for the equipment sucking and
5 discharging a fluid;

arithmetic means for performing the arithmetic operation
on the correlation between the plurality of instrumentation
amounts that are measured; and

normal state quantity storage means for storing the state
10 quantities including at least the correlation between said
plurality of instrumentation amounts as the state quantities
in the normal condition of said equipment, the state quantities
being arithmetic values such as a mean value obtained from the
instrumentation amounts measured when the operation is judged
15 to be normal;

characterized in that the state quantities of the abnormal
condition are obtained by making the arithmetic operation from
the state quantities of the normal condition stored in said
normal state quantity storage means.

20 2. An equipment diagnosis device comprising:

instrument means for measuring a plurality of
instrumentation amounts for the equipment sucking and
discharging a fluid;

arithmetic means for performing the arithmetic operation
25 on the correlation between the plurality of instrumentation

amounts that are measured;

normal state quantity storage means for storing the state quantities including at least the operated correlation between said plurality of instrumentation amounts as the state

5 quantities in the normal condition of said equipment, the state quantities being arithmetic values such as a mean value obtained from the instrumentation amounts measured when the operation is judged to be normal;

abnormal state quantity storage means for presetting a
10 threshold to judge the state quantities in the abnormal condition; and

judgement means for judging at which the current state quantities are among at least threes or more stages, including a normal stage, an abnormal stage and an intermediate stage
15 between the normal or abnormal stages by comparing the current state quantities including at least the state quantity in which said arithmetic means makes the arithmetic operation on the correlation between said plurality of instrumentation amounts for said fluid as the variables during the current operation
20 of said equipment and the state quantities of the normal state stored in said normal state quantity storage means or said threshold.

3. An equipment diagnosis device comprising:

instrument means for measuring a plurality of
25 instrumentation amounts for the equipment sucking and

discharging the fluid;

arithmetic means for performing the arithmetic operation on the correlation between the plurality of instrumentation amounts that are measured;

5 state quantity storage means for storing the state quantities including at least the operated correlation between said plurality of instrumentation amounts as the state quantities in the normal condition of said equipment, the state quantities being arithmetic values such as a mean value obtained
10 from the instrumentation amounts measured when the operation is judged to be normal, or storing the state quantities including at least the correlation between the plurality of instrumentation amounts operated by said arithmetic means from the plurality of instrumentation amounts measured when said
15 equipment is judged as the abnormal condition or set to achieve the abnormal condition as the state quantities in the abnormal condition of said equipment; and

judgement means for inferring the extent or cause of abnormality if it is judged that the current operating condition
20 is not the normal state by comparing the current state quantities including at least the state quantity in which said arithmetic means makes the arithmetic operation on the correlation between the plurality of instrumentation amounts for said fluid as the variables during the current operation of said equipment and
25 at least one of the state quantities of the normal state and

the state quantities of the abnormal state which are stored in said state quantity storage means.

4. The equipment diagnosis device according to claim 1, 2 or 3, characterized by further comprising comparison means
5 for comparing the distances between the current state quantities in the current operating condition including at least the state quantity obtained by arithmetic operation on the correlation between said plurality of instrumentation amounts as a plurality of variables with the state quantities of said normal condition
10 or abnormal condition that are stored, wherein the degree of abnormality in the operating condition is judged from a change in the distance from the state quantities of said normal state or the state quantities of said abnormal state, while said comparison means repeats the comparison in the operating
15 condition.

5. The equipment diagnosis device according to any one of claims 1 to 4, characterized in that the state quantities of said current operating condition or the state quantities of said abnormal condition provide a plurality of different
20 aggregates having different instrumentation amounts or variables.

6. The equipment diagnosis device according to any one of claims 1 to 5, characterized in that the degree of abnormality of the state quantities in the current operation can be displayed
25 by classifying the distances between the state quantities of

said normal state and the state quantities of said abnormal state.

7. The equipment diagnosis device according to any one of claims 1 to 6, characterized in that a range for setting
5 the normal operating condition or a threshold for judging the abnormal state is acquired by having the instrumentation amounts that are measured or the arithmetic values such as a mean value obtained from said instrumentation amounts, converting
compulsorily at least one of said measurement amounts or said
10 arithmetic values into another value, and making the arithmetic operation on the composite variables including the value after conversion.

8. The equipment diagnosis device according to any one of claims 1 to 7, characterized in that said judgement means
15 judges whether the operating condition of the fluid equipment such as a compressor, a pump or an air blower that treats a combustible fluid or a fluid harmful to the human body, or a driving apparatus of said fluid equipment, is normal or abnormal.

9. The equipment diagnosis device according to any one
20 of claims 1 to 8, characterized in that said equipment is the fluid equipment for circulating the fluid, and said judgement means discriminate a change in the physical quantities of the fluid indicating a nonconformity situation occurring when said fluid leaks from said equipment or the apparatus connected to
25 said equipment, or sucked in a liquid state into said equipment,

said equipment is deteriorated, a flow passage for circulating said fluid is clogged, bent or broken at any position, said fluid is deteriorated, or the operation of another constitutional apparatus connected to said flow passage of the fluid for said equipment is out of order, or judging that any abnormality thereof is included.

10. The equipment diagnosis device according to any one of claims 1 to 9, characterized in that the instrumentation amounts measured during the operation of said equipment are the physical quantities of the fluid, the quantities of electricity for driving said equipment driving means, or the quantities of electricity occurring from said equipment during the operation of said equipment, in which the quantities of electricity occurring during the operation of said equipment include an electromagnetic force, an electric wave, a leakage current and a shaft voltage.

11. The equipment diagnosis device according to any one of claims 1 to 10, characterized in that said judgement means judges whether or not said equipment is in the normal operating condition based on whether or not the state quantities in the current operating condition lie within a range of threshold indicating the normality or out of a range of threshold indicating the state quantities of the abnormal condition, and infers a failure time of said equipment from the relationship between the state quantities of the current operating condition

and the threshold.

12. A refrigerating cycle apparatus characterized by comprising:

a refrigerating cycle formed by connecting a compressor,
5 a condenser, expansion means and an evaporator via a pipeline,
and flowing a refrigerant through the inside thereof;

high pressure side measurement means that is high pressure
measurement means for measuring the high pressure of a
refrigerant pressure at any position on a flow passage leading
10 from the discharge side of said compressor to said expansion
means or condensation temperature measurement means for
measuring the saturation temperature at said high pressure;

low pressure side measurement means that is low pressure
measurement means for measuring the low pressure that is the
15 pressure of refrigerant at any position on the flow passage
leading from said expansion means to the suction side of said
compressor or evaporation temperature measurement means for
measuring the saturation temperature at said low pressure;

refrigerant temperature measurement means that is liquid
20 temperature measurement means for measuring the temperature
at any position on the flow passage leading from said condenser
to said expansion means, discharge temperature measurement
means for measuring the temperature at any position on the flow
passage leading from said compressor to said condenser, or
25 suction temperature measurement means for measuring the

temperature at any position on the flow passage leading from said evaporator to said compressor;

arithmetic means for performing the arithmetic operation on the composite variables from the measured values of said high pressure side measurement means, said low pressure side measurement means and said refrigerant temperature measurement means; and

judgement means for judging the abnormality of the refrigerating cycle based on the comparison result by comparing the values stored in the past and the current measured values or arithmetic values, as well as storing each of said measured values or said arithmetic values.

13. A refrigerating cycle apparatus characterized by comprising:

a refrigerating cycle formed by connecting a compressor, a condenser, expansion means and an evaporator via a pipeline and flowing a refrigerant through the inside thereof;

normal state quantity storage means for storing, as the state quantities of a normal operating condition, the state quantities including at least the state quantity obtained by making the arithmetic operation on the correlation between a plurality of measured values as a plurality of variables when said refrigerating cycle is normally operating;

abnormal state quantity storage means for storing, as the state quantities of an abnormal operating condition, the

state quantities including at least the state quantity obtained by making the arithmetic operation on the correlation between the plurality of measured values as the plurality of variables when there is an abnormality in said refrigerating cycle;

5 comparison means for comparing the distances between the current operating state quantities including at least the state quantity obtained by making the arithmetic operation on the correlation between the plurality of measured values in the current operating condition of said refrigerating cycle as the
10 plurality of variables and the plurality of state quantities stored in said normal state quantity storage means or the plurality of state quantities stored in said abnormal state quantity means; and

 judgement means for judging a degree of normality, an
15 degree of abnormality or a cause of abnormality of said refrigerating cycle from the distances compared by said comparison means or a change in the distance.

 14. The refrigerating cycle apparatus according to claim
12 or 13, characterized in that said judgement means for judging
20 the operating condition of said refrigerating cycle discriminates a refrigerant leakage from said refrigerating cycle, a refrigerant liquid back-flow to said compressor, a deterioration due to the lifetime of said compressor, a blemish or rupture on the surface of heat exchange for said condenser
25 or said evaporator, a deterioration or failure of a blower unit

of said condenser or said evaporator, clogging of a strainer for removing the contaminant inside the pipeline through which said refrigerant is circulated, clogging of a dryer for preventing the humidity of refrigerant, a bend, rupture or clogging of said pipeline, or a deterioration of a refrigerator oil useful for said compressor, or discriminates whether or not any of said abnormalities is involved.

15. The refrigerating cycle apparatus according to any one of claims 12 to 14, characterized by further comprising learning means having at least one state quantity of a numerical value representing the correlation of making the arithmetic operation on said plurality of measured values, the plurality of arithmetic values from said measured values, or said plurality of measured values or arithmetic values as the plurality of variables, and learning at least the numerical value representing the correlation calculated as said plurality of variables in learning the state quantities of the state where said refrigerating cycle is normally operating.

16. The refrigerating cycle apparatus according to any one of claims 12 to 15, characterized in that said judgement means for judging the operating condition of said refrigerating cycle acquires a threshold for distinguishing between the normal operating condition and the abnormal operating condition by having said measured values or the arithmetic values such as a mean value obtained by the arithmetic operation on said

measured values, compulsorily converting at least one of said measured values or said arithmetic values into another value, and making the arithmetic operation on a plurality of variables including the value after conversion.

5 17. The refrigerating cycle apparatus according to any one of claims 12 to 16, characterized in that the state quantities of the abnormal operation used by said judgement means for judging the operating condition of said refrigerating cycle are obtained by compulsorily converting any one of said measured
10 values or said arithmetic values obtained by making the arithmetic operation on said measured values into another value, said values converted into said another value including the measured value by refrigerant temperature measurement means that is liquid temperature measurement means for measuring the
15 temperature at any position on the flow passage leading from said condenser to said expansion means, discharge temperature measurement means for measuring the temperature at any position on the flow passage leading from said compressor to said condenser, or suction temperature measurement means for
20 measuring the temperature at any position on the flow passage leading from said evaporator to said compressor, or the arithmetic value obtained by making the arithmetic operation on the measured value.

 18. The refrigerating cycle apparatus according to any
25 one of claims 12 to 17, characterized by judging the degree

of abnormality of said refrigerating cycle from the value
obtained by making the arithmetic operation on an aggregate
in which said plurality of variables are combined and associated
with each other, and calculating the arithmetic operation result,
5 and predicting a critical time at which said refrigerating cycle
can not continue a stable operation.

19. The refrigerating cycle apparatus according to any
one of claims 12 to 18, characterized in that in comparing the
distances between the current operating state quantities
10 including at least the state quantity of correlation of making
the arithmetic operation on the plurality of measured values
from the current operating condition of said refrigerating cycle
as the plurality of variables, and the plurality of normal state
quantities stored or the plurality of abnormal state quantities
15 stored, a comparison is made between a refrigerant leakage amount
that is the operated state quantity in the current operation
or its equivalent arithmetic value and a preset refrigerant
amount within said refrigerating cycle, a permissible
refrigerant leakage amount or its equivalent state quantity,
20 to predict the time to lead to a critical refrigerant amount
capable of keeping the cooling power of said refrigerating cycle
from the comparison result.

20. A refrigerating cycle apparatus characterized by
comprising:

25 a refrigerating cycle formed by connecting a compressor,

a condenser, expansion means and an evaporator via a pipeline and flowing a refrigerant through the inside thereof;

high pressure side measurement means that is high pressure measurement means for measuring the high pressure of a
5 refrigerant pressure at any position on a flow passage leading from the discharge side of said compressor to said expansion means or condensation temperature measurement means for measuring the saturation temperature at said high pressure;

low pressure side measurement means that is low pressure
10 measurement means for measuring the low pressure that is a pressure of refrigerant at any position on the flow passage leading from said expansion means to the suction side of said compressor or evaporation temperature measurement means for measuring the saturation temperature at said low pressure;

15 refrigerant temperature measurement means that is liquid temperature measurement means for measuring the temperature at any position on the flow passage leading from said condenser to said expansion means, discharge temperature measurement means for measuring the temperature at any position on the flow
20 passage leading from said compressor to said condenser, or suction temperature measurement means for measuring the temperature at any position on the flow passage leading from said evaporator to said compressor;

judgement means for judging the abnormality of the
25 refrigerating cycle including a refrigerant leakage by storing

the measured values of said each measurement means or the arithmetic values calculated from said measured values, and comparing the stored values and the current measured values or arithmetic values; and

5 output means for outputting the refrigerant leakage information in preference to other abnormalities of the refrigerating cycle, when the refrigerant leakage is judged.

21. The refrigerating cycle apparatus according to claim 20, characterized by further comprising arithmetic means for
10 performing the arithmetic operation on an aggregate in which a plurality of parameters obtained from three or more measured values measured by said each measurement means are combined as the plurality of variables and associated with each other to calculate the arithmetic value, normal state quantity storage
15 means for storing said measured values or the arithmetic values when said refrigerating cycle is normally operating, comparison means for comparing the distances between said arithmetic value obtained from said measured values in the current operating condition of said refrigerating cycle and the arithmetic value
20 stored in said normal state quantity storage means or the arithmetic value obtained by making the arithmetic operation on said stored measured values, and judgement means for judging the degree of normality, the degree of abnormality or the cause of abnormality for said refrigerating cycle from the distances
25 or a change in the distances compared by said comparison means.

22. The refrigerating cycle apparatus according to claim 20 or 21, characterized by further comprising output means for outputting the extent of abnormality of the refrigerant leakage in said refrigerating cycle as an electric signal or
5 communicating it as a communication code with the outside, in which a plurality of thresholds are set halfway in the distance between said arithmetic values at the normal operating time and the abnormal operating time, and the refrigerant amount or refrigerant leakage amount within said refrigerating cycle,
10 or its equivalent arithmetic value, is set according to said plurality of thresholds.

23. The refrigerating cycle apparatus according to any one of claims 12 to 22, characterized in that the arithmetic value from said measured values, the numerical value
15 representing the correlation as the plurality of variables, the value obtained by making the arithmetic operation on an aggregate in which said plurality of variables are combined and associated with each other and calculating the arithmetic operation result, or said distance is the Mahalanobis distance
20 or the numerical value calculated from said Mahalanobis distance.

24. A fluid circuit diagnosis method characterized by including:

a measurement step of measuring a plurality of measurement
25 amounts from the physical quantities of a fluid flowing through

a circuit in the equipment sucking and discharging the fluid;

an arithmetic operation step of making the arithmetic operation on an aggregate in which a plurality of parameters obtained from said measured data are combined as a plurality of variables and associated with each other to calculate the arithmetic operation result; and

judgement step of judging whether or not said fluid is in the normal operating condition by comparing said arithmetic operation result with a set threshold.

10 25. The fluid circuit diagnosis method according to claim 24, characterized by further including a normal state storage step of storing the arithmetic operation result of said arithmetic means in a state where said fluid is normally running as a normal operating condition, an abnormal state storage step of storing the arithmetic operation result of said arithmetic means in a state where said fluid is abnormally running as an abnormal operating condition, and a step of setting a threshold halfway in the distance between said normal state and said abnormal state that are stored.

20 26. A fluid circuit diagnosis method characterized by including:

a measurement step of measuring a plurality of measurement amounts from the physical quantities of a fluid in the equipment sucking and discharging the fluid that circulates through a fluid circuit;

an arithmetic operation step of making the arithmetic operation on an aggregate in which a plurality of parameters obtained from said measurement amounts that are measured are combined as a plurality of variables and associated with each other to calculate the arithmetic operation result; and

a failure preview step of presuming the time elapsed before the fluid within said fluid circuit becomes abnormal from at least one of the arithmetic operation result at the normal operating time and the arithmetic operation result at the abnormal operating time, said arithmetic operation results being stored, and the operating time elapsed.

27. The fluid circuit diagnosis method according to any one of claims 24 to 26, characterized by further including a normal state storage step of storing the arithmetic operation result of said arithmetic means in a state where said fluid is normally running as a normal operating condition, an abnormal state storage step of storing the arithmetic operation result of said arithmetic means in a state where said fluid is abnormally running as an abnormal operating condition, and a failure preview step of presuming the time elapsed before a leakage of the fluid out of said fluid circuit reaches a preset critical value based on a change in the distance between the current arithmetic operation result of making the arithmetic operation on the plurality of variables at present obtained from the measurement values and at least one of the arithmetic operation result in

the normal operating condition and the arithmetic operation result in the abnormal operating condition, said arithmetic operation results being stored.

28. The fluid circuit diagnosis method according to claim 5 27, characterized in that said failure preview step includes making the estimation at an interval, in which the arithmetic operation result at the normal operating time as the reference or the data stored as the plurality of variables is plural data learned at every elapsed time.

10 29. A fluid circuit diagnosis method characterized by including:

a measurement step of measuring a plurality of measurement amounts from the physical quantities of a fluid in the equipment sucking and discharging the fluid that circulates through a 15 fluid circuit;

an arithmetic operation step of making the arithmetic operation on an aggregate in which a plurality of parameters obtained from said measurement amounts that are measured are combined as a plurality of variables and associated with each 20 other to calculate the arithmetic operation result; and

a failure preview step of presuming the time elapsed before the fluid within said fluid circuit becomes abnormal from at least one of the arithmetic operation result at the normal operating time and the arithmetic operation result at the 25 abnormal operating time, said arithmetic operation results

being stored, and the operating time elapsed.

30. A fluid circuit diagnosis method characterized by including:

a step of reading the arithmetic operation result of making
5 the arithmetic operation on an aggregate in which a plurality
of measurement amounts that the physical quantities of a fluid
the equipment sucking and discharging the fluid that circulates
through a fluid circuit are measured and stored by a plurality
of measurement means or a plurality of parameters obtained from
10 said measurement amounts are combined as a plurality of variables
and associated with each other from storage means connected
to said fluid circuit for which a maintenance order from the
maintenance order owner is accepted;

a step of judging whether or not the arithmetic operation
15 result of making the arithmetic operation on the aggregate in
which a plurality of parameters obtained from said read
arithmetic operation results or said measurement amounts are
combined as a plurality of variables and associated with each
other lies within a preset range; and

20 a step of communicating the judgement results to the
maintenance order owner;

wherein said judgement results include a plurality of
proposals regarding the maintenance contents and the time.

31. An equipment monitoring system for monitoring the
25 operating condition of the equipment operated by the equipment

diagnosis device according to any one of claims 1 to 11,
characterized in that at least one of the instrumentation amounts
measured by said equipment diagnosis device, the operated
amounts obtained by arithmetic operation, and the judgement
5 result as to whether or not said equipment is in the normal
operating condition by comparing said arithmetic values within
a set threshold is transmitted via a communication line or the
radio communication to a remote monitoring apparatus for
monitoring the operating condition of the equipment.

10 32. An equipment monitoring system characterized by
comprising failure preview means for presuming the time taken
until a failure of the equipment occurs based on the arithmetic
operation result at the normal operating time, the current
arithmetic operation result being obtained by making the
15 arithmetic operation on a plurality of instrumentation amounts
obtained from the current operating condition of said equipment
diagnosis device according to any one of claims 1 to 11, and
the time elapsed since the arithmetic operation result is stored.

33. A refrigerating cycle monitoring system
20 characterized by comprising a remote monitoring apparatus for
monitoring the operating condition of said refrigerating cycle
apparatus according to any one of claims 12 to 23, wherein at
least one of the measurement values measured by said
refrigerating cycle apparatus, the arithmetic values obtained
25 by arithmetic operation, and the judgement result as to whether

or not said refrigerating cycle apparatus is in the normal operating condition by comparing said arithmetic values are within a set threshold is transmitted via a communication line or the radio communication.

5 34. A refrigerating cycle monitoring system characterized by comprising:

 high pressure side measurement means that is high pressure measurement means for measuring the high pressure of a refrigerant pressure at any position on a flow passage leading
10 from the discharge side of a compressor to expansion means in a refrigerating cycle apparatus that constitutes a refrigerating cycle by connecting said compressor, a condenser, said expansion means and an evaporator via a pipeline and flowing a refrigerant through the inside thereof or condensation
15 temperature measurement means for measuring the saturation temperature at said high pressure;

 low pressure side measurement means that is low pressure measurement means for measuring the low pressure that is a pressure of refrigerant at any position on the flow passage
20 leading from said expansion means to the suction side of said compressor or evaporation temperature measurement means for measuring the saturation temperature at said low pressure;

 refrigerant temperature measurement means that is liquid temperature measurement means for measuring the temperature
25 at any position on the flow passage leading from said condenser

to said expansion means, discharge temperature measurement means for measuring the temperature at any position on the flow passage leading from said compressor to said condenser, or suction temperature measurement means for measuring the
5 temperature at any position on the flow passage leading from said evaporator to said compressor;

arithmetic means for acquiring the composite variables from the measured values of said high pressure side measurement means, said low pressure side measurement means and said
10 refrigerant temperature measurement means;

storage means for storing the measured value of said each measurement means and the arithmetic values such as the composite variables by making the arithmetic operation on said measured values;

15 judgement means for judging the abnormality of said refrigerating cycle based on the comparison result by comparing the values stored in the past by said storage means and the current measured values or arithmetic values; and

transmission means, formed by wire or radio, for
20 transmitting said measured values or the arithmetic values or the judgement result of said judgement means to a remote monitoring apparatus provided at a site away from said refrigerating cycle apparatus.

35. A refrigerating cycle monitoring system
25 characterized by comprising:

normal state storage means for storing the state quantities in the normal operating condition that are acquired or inferred by making the arithmetic operation on the correlation between a plurality of variables from the measurement results when a refrigerating cycle formed by connecting a compressor, a condenser, expansion means and an evaporator via a pipeline and flowing a refrigerant through the inside thereof is normally operating;

abnormal state storage means for storing the state quantities in a plurality of abnormal states that are acquired by making the arithmetic operation on the correlation between a plurality of variables from the measurement results of the operation when there is an abnormality in the circulation of the refrigerant in said refrigerating cycle, or storing a plurality of abnormal state quantities obtained by regenerating the plurality of abnormal states;

comparison means for comparing the distances between the state quantities obtained from the current operating condition of said refrigerating cycle and the state quantities stored in said normal state storage means or the plurality of state quantities stored in said abnormal state storage means; and

judgement means for judging the degree of normality, the degree of abnormality or the cause of abnormality in said refrigerating cycle from the distances compared by said

comparison means or a change in the distance;

wherein at least one of said current state quantities,
the distances compared by said comparison means or the change
in the distance, and the degree of normality, the degree of
abnormality or the cause of abnormality for said refrigerating
5 cycle judged by said judgement means is transmitted by
transmission means formed by wire or radio.

36. A refrigerating cycle monitoring system according
to claim 34 or 35, characterized in that the information as
to the presumed time taken until a failure of the equipment
10 occurs based on the arithmetic values measured and calculated
at the normal operating time and the operating time elapsed
of the refrigerating cycle, the arithmetic values being measured
and calculated in the current operating condition, is
transmitted and displayed to a remote monitoring apparatus via
15 said transmission means.

37. The refrigerating cycle monitoring system according
to any one of claims 34 to 36, characterized by further comprising
normal state storage means for learning and storing the
arithmetic operation result of said arithmetic means as a normal
20 operating state in a condition where said refrigerating cycle
is normally operating, abnormal state storage means for learning
and storing the arithmetic operation result of said arithmetic
means as an abnormal operating state in a condition where said
refrigerating cycle is abnormally operating such as a
25 refrigerant leakage, and a plurality of thresholds set halfway

in the distance between arithmetic operation results of the normal state and the abnormal state that are stored, wherein the distance between the arithmetic operation result of the current operating condition and said threshold or a temporal
5 change in the distance is displayed in said remote monitoring apparatus.

38. The refrigerating cycle monitoring system according to any one of claims 34 to 37, characterized by further comprising output means for setting the refrigerant amount or refrigerant
10 leakage amount within said refrigerating cycle as the arithmetic value equivalent to each amount and outputting the abnormality of said refrigerating cycle as an electric signal or communicating it as a communication code, wherein if a refrigerant leakage, if detected, is outputted to said remote
15 monitoring apparatus prior to other judgement results of said judgement means.

39. A refrigerating cycle monitoring system comprising:
normal state storage means for storing the arithmetic operation result of making the arithmetic operation on the
20 correlation between the physical quantities of a refrigerant in a condition where the refrigerant flowing through a refrigerating cycle is normal, as a normal operating state, abnormal state storage means for storing the arithmetic operation result of making the arithmetic operation on the
25 correlation between the physical quantities of the refrigerant

in an abnormal condition where said refrigerant leaks out of
said refrigerating cycle, and refrigerant leakage foreseeing
means for foreseeing the time when said refrigerant leaks out
of said refrigerating cycle by comparing the distances between
5 the arithmetic operation result of making the arithmetic
operation on the correlation between the physical quantities
of the refrigerant in the current operating condition and at
least one of the normal operating condition and the abnormal
operating condition that are stored, wherein the foreseen result
10 of said refrigerant leakage foreseeing means is transmitted
to a remote monitoring apparatus.